National Institute of Environmental Health Sciences

The zoonotic flaviviruses of southern, south-eastern and eastern Asia, and Australasia: The potential for emergent viruses

Author(s): Mackenzie JS, Williams DT
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Abstract:

The genus Flaviviridae comprises about 70 members, of which about 30 are found in southern, south-eastern and eastern Asia and Australasia. These include major pathogens such as Japanese encephalitis (JE), West Nile (WN), Murray Valley encephalitis (MVE), tick-borne encephalitis, Kyasanur Forest disease virus, and the dengue viruses. Other members are known to be associated with mild febrile disease in humans, or with no known disease. In addition, novel flaviviruses continue to be discovered, as demonstrated recently by New Mapoon virus in Australia, Sitiawan virus in Malaysia, and ThCAr virus in Thailand. About 19 of these viruses are mosquito-borne, six are tick-borne, and four have no known vector and represent isolates from rodents or bats. Evidence from phylogenetic studies suggest that JE, MVE and Alfuy viruses probably emerged in the Malaya-Indonesian region from an African progenitor virus, possibly a virus related to Usutu virus. WN virus, however, is believed to have emerged in Africa, and then dispersed through avian migration. Evidence suggests that there are at least seven genetic lineages of WN virus, of which lineage 1b spread to Australasia as Kunjin virus, lineages 1a and 5 spread to India, and lineage 6 spread to Malaysia. Indeed, flaviviruses have a propensity to spread and emerge in new geographic areas, and they represent a potential source for new disease emergence. Many of the factors associated with disease emergence are present in the region, such as changes in land use and deforestation, increasing population movement, urbanization, and increasing trade. Furthermore, because of their ecology and dependence on climate, there is a strong likelihood that global warming may significantly increase the potential for disease emergence and/or spread.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Human Conflict/Displacement, Temperature

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Asia, Australasia

Asian Region/Country: Other Asian Region

Other Asian Region: southern Asia, south-eastern Asia;eastern Asia

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease, Tick-borne Disease

Mosquito-borne Disease: Dengue, Viral Encephalitis, West Nile Virus

Tick-borne Disease: Tick-borne Encephalitis, Other Tick-borne Disease

Tick-borne Disease (other): Kyasanur Forest disease virus

Resource Type: ☑

format or standard characteristic of resource

Review

Timescale: ☑

time period studied

Time Scale Unspecified